CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO. _____

WASTE DISCHARGE REQUIREMENTS
FOR
CALIFORNIA DEPARTMENT OF CORRECTIONS AND REHABILITATION
FOR
OPERATION OF CLASS II SURFACE IMPOUNDMENTS
DEUEL VOCATIONAL INSTITUTION
SAN JOAQUIN COUNTY

The California Regional Water Quality Control Board, Central Valley Region, (hereafter Regional Board) finds that:

1. The California Department of Corrections and Rehabilitation (hereafter Discharger) proposes to construct and operate a reverse osmosis water treatment plant at the Deuel Vocational Institution. The facility is located east of the City of Tracy in San Joaquin County in Section 20, T2S, R6E, MDB&M, as shown in Attachment A, which is incorporated herein and made part of this Order by reference.

2. The proposed facility will treat groundwater at the Deuel Vocational Institution (DVI) with a reverse osmosis plant, brine concentrator and four evaporation basins to be used for brine discharge. The treatment facility and the evaporation ponds are shown in Attachment B, which is incorporated herein and made part of this Order by reference. The facility is comprised of Assessor's Parcel Number 239-120-01.

3. On 24 October 2005, the Discharger submitted a Report of Waste Discharge (RWD) for the brine evaporation basins. Revisions to the RWD were provided on 30 January 2006 and a final RWD was submitted on 11 April 2006. The information in the RWD has been used in writing these waste discharge requirements (WDRs). The RWD contains the applicable information required in Title 27, California Code of Regulations (CCR), Chapter 4, Subchapter 3, Article 4.

4. This Order classifies the four brine evaporation basins as Class II surface impoundments in accordance with Title 27, CCR Section 20005, et seq. (Title 27).

5. The average brine flow to the surface impoundments will be 4 gallons per minute or approximately 5,600 gallons per day (gpd) resulting in about 2 million gallons of wastewater per year. The approximate area of each surface impoundment is 0.85 acres. The maximum capacity of each surface impoundment while maintaining the required two-foot freeboard is approximately 1.0 million gallons. The Discharger submitted a water balance demonstrating adequate capacity at a flow of 5,600 gpd.

6. During scheduled maintenance and emergency situations, DVI's pumped groundwater may bypass the reverse osmosis plant and brine concentrator, and be directly discharged to the

evaporation basins. After the maintenance or emergency ends, this water will be removed from the evaporation basins, treated by the reverse osmosis plant and brine concentrator, and the brine returned to the basins, thus maintaining the 5,600 gpd monthly average flow rate.

WASTE AND UNIT CLASSIFICATIONS

7. The wastewater consists of concentrated brine from the reverse osmosis water treatment plant. The brine waste characteristics were developed based on feed water quality, RO treatment removal, finished water quality goals and the resulting mass balance. The estimated concentrations are as follows:

Parameter	Concentration[1]	Units
Total Dissolved Solids	313,600	mg/L
Aluminum	7.56	mg/L
Iron	33.6	mg/L
Manganese	58.8	mg/L
Boron	84	mg/L
Calcium	33,600	mg/L
Magnesium	18,200	mg/L
Sodium	39,738	mg/L
Potassium	1,106	mg/L
Barium	21	mg/L
Strontium	1,092	mg/L
Sulfate	30,040	mg/L
Chloride	154,000	mg/L
Total Silica	6,440	mg/L

[1] These are estimated concentrations and the Discharger is required to monitor the waste brine once the treatment plant is operational. Once additional data is received, the waste characteristics may change and the Monitoring and Reporting Program may be revised.

8. Designated waste is defined in Title 27, Section 20210, as a nonhazardous waste which consists of, or contains pollutants which, under ambient environmental conditions at the waste management unit, could be released at concentrations in excess of applicable water quality standards, or which could cause degradation of waters of the state.

9. The discharge poses a significant threat to water quality. Therefore, the discharge is a designated waste and, as such, must be discharged to a Class II surface impoundment as required by Title 27.

SITE DESCRIPTION

10. The estimated hydraulic conductivity of the native soils underlying the surface impoundments is estimated at $1x10^{-7}$ cm/sec.

11. Segment Number 7 of the Great Valley Fault is the closest Holocene fault and is located approximately 9.1 miles southwest of the facility. The maximum moment magnitude seismic event along this fault is 6.7 on the Richter scale. The peak ground acceleration on rock at the site for the maximum credible earthquake is 0.29 g.

12. Land use within 1,000 feet of the facility is predominantly agriculture.

13. The facility receives an average of 9.94 inches of precipitation per year as measured at the Tracy Carbona Station. The mean pan evaporation is 97.41 inches per year as measured at the Tracy Pumping Plant.

14. The 1000-year, 24-hour precipitation event is estimated to be 9.97 inches, based on the Department of Water Resources' bulletin entitled *Rainfall Depth-Duration-Frequency for California*, revised November 1982, updated August 1986.

15. The waste management facility is within a 100-year flood plain based on the Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Map, Community-Panel Number 060299 0730 B. In order to mitigate potential washout of the surface impoundments in the event of a 100-year flood event, the ponds will be constructed within a 16-feet fill pad and the tops of the surface impoundment berms will be at an elevation 2-feet above the 100-year floodplain.

SURFACE AND GROUND WATER CONDITIONS

16. The *Water Quality Control Plan for Sacramento and San Joaquin River Basins, Fourth Edition* (hereafter Basin Plan), designates beneficial uses, establishes water quality objectives, and contains implementation plans and policies for all waters of the Basin, and incorporates by reference plans and policies adopted by the State Water Resources Control Board (State Board). Pursuant to Section 13263(a) of the California Water Code, waste discharge requirements must implement the Basin Plan.

17. Surface drainage is toward the San Joaquin River in the Sacramento San Joaquin Delta Hydrologic Area (544.00).

18. The beneficial uses of the Sacramento- San Joaquin Delta are municipal and domestic supply; agricultural supply; industrial; industrial service supply, water contact recreation; non-contact

water recreation; warm freshwater habitat; cold freshwater habitat; migration of aquatic organism; spawning, reproduction, and/or early development; wildlife habitat; and navigation.

19. The designated beneficial uses of the groundwater, as specified in the Basin Plan, are domestic and municipal supply, agricultural supply, industrial service supply and industrial process supply.

20. In May 2005, a geotechnical investigation was performed in the proposed location of the surface impoundments. Four borings were drilled and first groundwater ranged from 3.4 to 5.0 feet below the native ground surface (bgs).

21. The Discharger has not collected any shallow groundwater data. Prior to the discharge of waste to the surface impoundments, the Discharger is required to install groundwater monitoring wells and provide water quality protection standards that are based upon a minimum of one year of groundwater data collection.

22. There are 94 municipal, domestic, industrial, or agricultural groundwater supply wells within one mile of the site. The Discharger operates three groundwater supply wells, Well No. 4, Well No. 5 and Well No. 6. Well No. 4 (State ID No. 3910800-002) is drilled to 490 feet bgs, Well No. 5 (State ID No. 3910900-003) is drilled to 500 feet bgs and Well No. 6 (State ID No. 3910800-004) is drilled to 615 feet bgs.

23. Monitoring data gathered for the onsite supply wells indicates groundwater quality has total dissolved solids (TDS) concentrations ranging between 840 to 2200 mg/l.

24. The predicted direction of groundwater flow is toward the east to northeast.

25. The Discharger proposes to install a minimum of three groundwater monitoring wells. Once a true groundwater gradient for the shallow groundwater zone is determined, the Discharger may be required to install additional groundwater monitoring wells such that the detection monitoring system is in compliance with Title 27.

WASTE MANAGEMENT DESIGN

26. The Discharger proposes an engineered alternative to the prescriptive liner requirements of Title 27 for the Class II surface impoundments. The engineered alternative consists of the following from the top down:

    a. A primary 60-mil thick high density polyethylene (HDPE) geomembrane.
    b. A geonet drainage layer, as a leachate collection and removal system (LCRS).
    c. A secondary 60-mil thick HDPE geomembrane in lieu of the clay liner.
    d. A geonet drainage layer as a vadose zone monitoring system.
    e. A tertiary 60-mil thick HDPE geomembrane.

27. Side slope liners are proposed to be constructed of the same materials and in the same sequence and manner as the bottom liner system. The liner subgrade will be prepared in an appropriate manner using accepted engineering and construction methods so as to provide a surface that is smooth and free from rocks, sticks, and other debris that could damage or otherwise limit the performance of the geomembrane, and certified in accordance with this Order and the approved CQA Plan.

28. The ponds will be constructed with an inboard slope of 3 to 4:1 and outboard slopes of 2:1. The berm width at the crest will be approximately 20 feet. To protect the liners, a soil layer approximately 2 to 4 foot thick will be placed over the liner system.

29. The depth to shallow groundwater ranges from 3.4 to 5.0 feet bgs, measured during the geotechnical study performed in May 2005. Title 27, CCR Section 20240(c) requires a minimum separation of five feet between waste and the highest anticipated groundwater elevation. To mitigate the five foot separation requirement, the Discharger has proposed to construct the surface impoundments within 16 feet of fill, with the bottom elevation of each surface impoundment five feet above natural grade.

30. Each surface impoundment will have a geonet LCRS blanket across the entire area of each base. Prior to construction the Discharger is required to submit additional design information for the LCRS sump design and a fail safe mechanism that will assure that the sumps will not overflow with leachate.

31. The Discharger proposes to install a pan lysimeter (geonet blanket) under the entire area of the base of each surface impoundment that will serve as an engineered alternative to the prescriptive unsaturated zone monitoring system requirements of Title 27, CCR Section 20415(d).

32. Title 27 CCR Section 20080(b) allows the Regional Board to consider the approval of an engineered alternative to the prescriptive standard. In order to approve an engineered alternative, the Discharger must demonstrate that the prescriptive design is unreasonably and unnecessarily burdensome and will cost substantially more than an alternative which will meet the criteria contained in Title 27 CCR Section 20080(b), or would be impractical and would not promote attainment of applicable performance standards. The Discharger must also demonstrate that the proposed engineered alternative liner system is consistent with the performance goal addressed by the particular prescriptive standard, and provides protection against water quality impairment equivalent to the prescriptive standard in accordance with Title 27 CCR Section 20080(b)(2). For this facility, the Discharger was not required to repeat the engineered alternative demonstration which had been made for other facilities. There are no significant differences in the characteristics of already approved engineered alternative liners and the liner system proposed for the Deuel Vocational Institution.

33. Section 13360(a)(1) of the California Water Code allows the Regional Board to specify the design, type of construction, and/or particular manner in which compliance must be met in waste discharge requirement orders for the discharge of waste at solid waste disposal facilities.

34. Construction may proceed only after all applicable construction quality assurance plans have been approved.

CEQA AND OTHER CONSIDERATIONS

35. The State of California Department of Corrections and Rehabilitation certified the final Negative Declaration for the reverse osmosis plant and evaporation basins on 4 May 2005 and filed a Notice of Determination on 5 May 2005 in accordance with the California Environmental Quality Act (Public Resources Code Section 21000 et seq.) and CEQA guidelines (Title 14 CCR Section 15000 et seq.).

36. This order implements:

    a. *The Water Quality Control Plan for the Sacramento River and San Joaquin River Basins, Fourth Edition*; and

    b. The prescriptive standards and performance goals of Chapters 1 through 7, Subdivision 1, Division 2, Title 27, of the California Code of Regulations, effective 18 July 1997, and subsequent revisions.

37. Section 13267(b) of California Water Code provides that: "In conducting an investigation specified in subdivision (a), the Regional Board may require that any person who has discharged, discharges, or is suspected of discharging, or who proposed to discharge within its region, or any citizen or domiciliary, or political agency or entity of this state who had discharged, discharges, or is suspected of discharging, or who proposed to discharge waste outside of its region that could affect the quality of the waters of the state within its region shall furnish, under penalty of perjury, technical or monitoring program reports which the board requires. The burden, including costs of these reports, shall bear a reasonable relationship to the need for the reports and the benefits to be obtained from the reports. The monitoring and reporting program required by this Order and the attached "Monitoring and Reporting Program No. ____" are necessary to assure compliance with these waste discharge requirements. The Discharger owns and operates the facility that discharges the waste subject to this Order.

PROCEDURAL REQUIREMENTS

38. All local agencies with jurisdiction to regulate land use, solid waste disposal, air pollution, and to protect public health have approved the use of this site for the discharges of waste to land stated herein.

39. The Regional Board notified the Discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for this discharge, and has provided them with an opportunity for a public hearing and an opportunity to submit their written views and recommendations.

40. The Regional Board, in a public meeting, heard and considered all comments pertaining to the discharge.

IT IS HEREBY ORDERED, pursuant to Sections 13263 and 13267 of the California Water Code, that the California Department of Corrections and Rehabilitation, its agents, successors, and assigns, in order to meet the provisions of Division 7 of the California Water Code and the regulations adopted thereunder, shall comply with the following:

A. PROHIBITIONS

1. The discharge of 'hazardous waste' is prohibited. For the purposes of this Order, the term 'hazardous waste' is as defined in Title 23, California Code of Regulations, Section 2510 et seq.

2. The discharge of solid or liquid waste or leachate to surface waters, surface water drainage courses, or groundwater is prohibited.

3. The discharge of wastes outside of a waste management unit or portions of a waste management unit specifically designed for their containment is prohibited.

4. **Discharge of waste to any Class II surface impoundment is prohibited until the following tasks are completed and approved by Regional Board staff:**

   a. Installation of a background groundwater monitoring system.
   b. Establishment of background groundwater quality through at least one year of monitoring (a minimum of 8 samples is required to develop statistical values for inorganic monitoring parameters).
   c. Submittal of a Water Quality Protection Standard Report.
   d. Submittal of a plan for a groundwater quality monitoring system.

   e. Installation of an approved groundwater quality monitoring system.
   f. Establishment of Financial Assurance funds for corrective action, unit closure and post-closure maintenance.

B. DISCHARGE SPECIFICATIONS

General Specifications

1. Wastes shall only be discharged into, and shall be confined to, the waste management units (WMUs) specifically designed for their containment.

2. Prior to the discharge of waste to a WMU, all wells within 500 feet the WMUs shall have sanitary seals or shall be properly abandoned. A record of the sealing and/or abandonment of such wells shall be sent to the Regional Board and to the State Department of Water Resources.

Protection From Storm Events

3. Waste management units shall be designed, constructed and operated to prevent inundation or washout due to flooding events with a 100-year return period.

4. Precipitation and drainage control systems shall be designed, constructed and maintained to accommodate the anticipated volume of precipitation and peak flows from surface runoff under 100-year, 24-hour precipitation conditions.

5. Annually, prior to the anticipated rainy season, any necessary erosion control measures shall be implemented, and any necessary construction, maintenance, or repairs of precipitation and drainage control facilities shall be completed to prevent erosion or flooding of the site.

Class II Surface Impoundment

6. The monthly average flow to the Class II Surface Impoundments shall not exceed 5,600 gpd.

7. Both the bottom liner and side slope liners of the Class II surface impoundments shall be constructed in accordance with the following engineered alternative that is comprised, in ascending order, of the following:

    a. A primary 60-mil thick high density polyethylene (HDPE) geomembrane.
    b. A geonet drainage layer, as a leachate collection and removal system (LCRS).
    c. A secondary 60-mil thick HDPE geomembrane in lieu of the clay liner.
    d. A geonet drainage layer as a vadose zone monitoring system.
    e. A tertiary 60-mil thick HDPE geomembrane.

8. The Discharger may propose changes to the liner system design prior to construction, provided that approved components are not eliminated, the engineering properties of the components are not substantially reduced, and the proposed liner system results in the protection of water quality equal to or greater than the design prescribed by Title 27 and this Order. The proposed changes may be made following approval by the Executive

Officer. Substantive changes to the design require reevaluation as an engineered alternative and approval by the Regional Board.

9. The unsaturated zone monitoring system shall be capable of measuring both saturated and unsaturated flows that may occur as a result of a release from the WMU.

10. Each surface impoundment and related containment structures shall be constructed and maintained to prevent inundation, erosion, slope failure, washout, and overtopping under 1,000-year, 24-hour precipitation conditions, and shall be designed to contain the 100-year annual wet season precipitation without using the required two feet of freeboard.

11. Materials used to construct liners shall have appropriate physical and chemical properties to ensure containment of discharged wastes over the operating life, closure, and post-closure maintenance period of the surface impoundments.

12. Materials used to construct the LCRSs shall have appropriate physical and chemical properties to ensure the required transmission of leachate over the life of the surface impoundments and the post-closure maintenance period.

13. Each LCRS shall be designed, constructed, and maintained to collect twice the anticipated daily volume of leachate generated by each surface impoundment and to prevent the buildup of hydraulic head on the underlying liner at any time. The depth of the fluid in any LCRS sump shall be kept at the minimum needed for safe pump operation.

14. Any direct-line discharge to a surface impoundment shall have fail-safe equipment or operating procedures to prevent overfilling.

15. The surface impoundment(s) shall be designed, constructed and maintained to prevent scouring and/or erosion of the liners and other containment features at points of discharge to the impoundments and by wave action at the water line.

16. Leachate removed from a surface impoundment's primary LCRS shall be discharged to the impoundment from which it originated.

17. Leachate generation by each waste containment unit LCRS shall not exceed 85% of the design capacity of (a) the LCRS, or (b) the sump pump. If leachate generation exceeds this value and/or if the depth of the fluid in an LCRS exceeds the minimum needed for safe pump operation, then the Discharger shall immediately cease the discharge of waste, excluding leachate, to the waste management unit and shall notify the Regional Board in writing within **seven days**. Notification shall include a timetable for a remedial action to repair the containment structures or other action necessary to reduce leachate production.

18. If leachate is detected in the vadose zone monitoring system of a surface impoundment (indicating a leak in the containment structures) the Discharger shall:

    a. Immediately cease discharge of waste, excluding leachate to the surface impoundment, until the leaks can be found and repaired.

    b. Verbally notify the Regional Board that the containment structures have failed within 72 hours.

    c. Submit written notification of the release to the Regional Board within seven days, the notification should include a time schedule to repair the containment structures.

    d. The discharge of wastes to the surface impoundment shall not resume until the Regional Board has determined that repairs to the liners are complete and there is no further threat to water quality.

19. Solids that accumulate in the surface impoundments shall be periodically removed to maintain minimum freeboard requirements and to maintain sufficient capacity for surface impoundment leachate and for the discharge of wastes. Prior to removal of these solids, sufficient samples shall be taken for their characterization and classification pursuant to Article 2, Subchapter 2, Chapter 3, Division 2 of Title 27. The rationale for the sampling protocol used, the results of this sampling, and a rationale for classification of the solids shall be submitted to Regional Board staff for review. Before any disposal of this sediment, the Discharger must obtain concurrence on the disposal method from Regional Board staff.

20. Construction shall proceed only after all applicable construction quality assurance plans have been approved.

Class II Surface Impoundment Closure

21. The closure of each surface impoundment shall be under the direct supervision of a California registered civil engineer or certified engineering geologist.

22. At closure of each surface impoundment, all residual wastes, including liquids, sludges, precipitates, settled solids, liner materials, and adjacent natural geologic materials contaminated by wastes, shall be completely removed and discharged to a waste management unit approved by Regional Board staff. If after reasonable attempts, the Discharger demonstrates the removal of all remaining contamination is infeasible, the surface impoundment shall be closed as a landfill.

C. RECEIVING WATER LIMITATIONS

Water Quality Protection Standards

The concentrations of Constituents of Concern in waters passing through the Points of Compliance shall not exceed the Concentration Limits established pursuant to Monitoring and Reporting Program No____, which is attached to and made part of this Order.

D. FINANCIAL ASSURANCE

1. The Discharger shall, by **30 April of each year**, submit for review and approval, plans with detailed cost estimates and a demonstration of assurances of financial responsibility for initiating and completing corrective action for all known or reasonably foreseeable releases from the waste management unit. The Discharger shall provide the assurances of financial responsibility to the Regional Board as required by Title 27 CCR, Division 2, Subdivision 1, Chapter 6. The assurances of financial responsibility shall provide that funds for corrective action shall be available to the Regional Board upon the issuance of any order under California Water Code, Division 7, Chapter 5. The Discharger shall adjust the cost annually to account for inflation and any changes in facility design, construction, or operation. The financial assurance fund for corrective action shall be established **prior to discharging waste to the surface impoundment**.

2. The Discharger shall, by **30 April of each year**, submit for review and approval, plans with detailed cost estimates and a demonstration of assurances of financial responsibility to ensure closure and post-closure maintenance of each waste management unit in accordance with its approved closure and post-closure maintenance plans. The Discharger shall provide the assurances of financial responsibility to the Regional Board as required by Title 27 CCR, Division 2, Subdivision 1, Chapter 6. The assurances of financial responsibility shall provide that funds for corrective action shall be available to the Regional Board upon the issuance of any order under California Water Code, Division 7, Chapter 5. The Discharger shall adjust the cost annually to account for inflation and any changes in facility design, construction, or operation. The financial assurance fund for closure and post-closure maintenance shall be established **prior to discharging waste to the surface impoundment.**

E. PROVISIONS

4. The Discharger shall comply with the Standard Provisions and Reporting Requirements, dated September 2003, which are hereby incorporated into this Order. The Standard Provisions and Reporting Requirements contain important provisions and requirements with which the Discharger must comply. A violation of any of the Standard Provisions and Reporting Requirements is a violation of these waste discharge requirements.

5. The Discharger shall comply with Monitoring and Reporting Program No._____, which is attached to and made part of this Order. This compliance includes, but is not limited to, maintenance of waste containment facilities and precipitation and drainage controls and monitoring groundwater, the unsaturated zone, and surface waters throughout the active life of the waste management units and the post-closure maintenance period. A violation of Monitoring and Reporting Program No. R5-_____ is a violation of these waste discharge requirements.

6. The Discharger shall maintain legible records of the volume and type of waste discharged to the surface impoundments and the manner and location of the discharge. Such records shall be maintained at the facility until the beginning of the post-closure maintenance period. These records shall be available for review by representatives of the Board and of the State Water Board, copies of these records shall be sent to the Regional Board.

7. The Discharger shall provide proof to the Regional Board **within sixty days after completing final closure** that the deed to the surface impoundment facility property, or some other instrument that is normally examined during title search, has been modified to include, in perpetuity, a notation to any potential purchaser of the property stating that:

    a. The parcel has been used for disposal of liquid wastes.
    b. Land use options for the parcel are restricted in accordance with the post-closure land uses set forth in the post-closure plan and in WDRs for the surface impoundment.
    c. In the event that the Discharger defaults on carrying out either the post-closure maintenance plan or any corrective action needed to address a release, then the responsibility for carrying out such work falls to the property owner.

8. The Regional Board will review this Order periodically and may revise requirements when necessary.

9. In the event of any change in ownership of this waste management facility, the Discharger shall notify the succeeding owner or operator in writing of the existence of this Order. A copy of that notification shall be sent to the Regional Board.

10. The following reports shall be submitted pursuant to Section 13267 of the California Water Code and shall be prepared by a registered professional:

    a. By **1 August 2006** the Discharger shall submit a Groundwater Monitoring Well Installation Workplan. The Workplan shall describe the proposed background and detection monitoring well locations. At a minimum, the Workplan shall include all items as listed on Attachment C, *Requirements for Monitoring Well Installation Workplans and Monitoring Well Installation Reports.* Attachment C is attached hereto and made part of this Order by reference.

b. By **1 November 2006**, the Discharger shall submit a *Sampling and Analysis Plan and a Groundwater Monitoring Well Installation Report* that includes all items listed in Section 2 of Attachment C.

c. Within **60 days** before the construction of the surface impoundments, the Discharger shall submit final construction and design plans for the surface impoundment.

d. Within **45 days** of discharging waste into the surface impoundments, the Discharger shall submit a background groundwater characterization report and Water Quality Protection Standard (WQPS) report. The items that shall be included in the WQPS report are outlined in Section B of MRP Order No. _____.

e. Within **60 days** after completing construction, a final Construction Quality Assurance Plan shall be submitted. The Plan shall be in accordance with Title 27 CCR Section 20324 and shall demonstrate that the surface impoundments were constructed in accordance with the approved construction plans.

f. Within **60 days** after completing construction, the Discharger shall submit the professionally surveyed bottom elevations of the constructed surface impoundments.

I, PAMELA C. CREEDON, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region, on _____.

_____
PAMELA C. CREEDON, Executive Officer

VJI: 4/25/2006